UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/667,576	09/22/2000	Tetsufumi Tsuzaki	50212-132	7978

20277   7590   10/28/2002

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EXAMINER
CUNNINGHAM, STEPHEN C

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 10/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _23 July 2002_ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-31_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-31_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-8, 14-21, 28, and 30 are rejected under 35 U.S.C. 102(b) as being

anticipated by Onaka et al. Patent Number 5,894,362.

With respect to claims 1 and 14, Onaka et al. teach an optical amplifier

and the method inherent in the apparatus comprising:

one or a plurality of optical amplification sections each which has an

optical waveguide doped with a fluorescent material;

an optical pumping light source;

an optical filter capable of changing a gradient $dL/d\lambda$ of loss L dB with

respect to a wavelength λ nm. In a predetermined wavelength band; and

control means for controlling the optical pump source and for adjusting the

gradient $dL/d\lambda$ of said optical filter.

See figures 8 and 13 and column 8, lines 32-64, and column 12, lines 1-

15. It is inherent that the filter must adjust a gradient $dL/d\lambda$ in order to flatten an

optical amplifier spectrum having a slope that may vary with pumping power

and/or environmental conditions.

With respect to claims 2 and 15, it is inherent that the filter of Onaka et al. must satisfy $L \approx a(\lambda - \lambda c) + b$ in order to compensate for the tilt induced by the amplifier and thus perform the function of flattening the gain spectrum as taught.

With respect to claims 3 and 16, Onaka et al. teach an optical amplifier, and the method inherent in the apparatus, comprising a gain equalizer. See figure 13. The gain equalizer also functions as the filter controlling the gradient $dL/d\lambda$.

With respect to claims 4 and 17, Onaka et al. teach an optical amplifier and the method inherent in the apparatus comprising a wave number monitor detecting the number of signal light components contained in the multiplexed signal, and where the control adjusts the amplifier accordingly. See figures 8-10 and 13, and column 8, line 60 through column 10, line 2.

With respect to claims 5 and 18, Onaka et al. teach an optical amplifier and the method inherent in the apparatus comprising input light power detection means and control means that adjust the gradient $dL/d\lambda$ of the optical filter based on the results of the light detection means. See figure 13, and column 12, lines 1-31.

With respect to claims 6 and 19, Onaka et al. teach an optical amplifier and the method inherent in the apparatus that controls the output of the amplifier, inherently controlling the gain. The control means further adjusts the gradient of the optical filter. See column 8, lines 60-64.

With respect to claims 7 and 20, Onaka et al. teach an optical amplifier and the method inherent in the apparatus further comprising detection means detecting each wavelength an power of the signal light, control means adjusts the gradient of the optical on the basis of the detected light signals including the shortest and longest wavelengths detected.

With respect to claims 8 and 21, Onaka et al. teach an optical amplifier and the method inherent in the apparatus comprising read means for reading information related to the shortest and longest wavelengths of the signal light component and determines the power deviation on the basis of the information obtained by the read means. See, for example, column 10, lines 3-39.

With respect to claims 28 and 30, Onaka et al. teach that the optical amplifier comprises one of an erbium doped fiber amplifier, a Raman amplifier, and a semiconductor optical amplifier. See column 8, lines 26-44. Please note that an EDFA, a semiconductor optical amplifier, and a Raman amplifier with multiple pump wavelengths are all known to have bandwidths greater than 20 nm.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 9-11 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Kinoshita '366.

With respect to claims 9 and 22, Onaka et al. teach an optical amplifier and the method inherent in the apparatus comprising means for detecting a noise component of the signal spectrum, but fails to teach detecting at wavelengths greater than and shorter than the signal spectrum. Kinoshita teaches an ASE detection means where the detector detects a wavelength longer than the longest signal wavelength and a wavelength shorter than the shortest signal wavelength, see figures 10, 11B, 14, and 15, and column 11, lines 1-18, column 12, line 1 through column 13, line 6. It would have been obvious to modify the apparatus of Onaka et al. by implementing the specific ASE monitor of Kinoshita for the generic ASE monitor of Onaka et al. in order to monitor the slope of the ASE spectrum and control the amplifier to reduce the occurrence of channels being buried by ASE.

With respect to claims 10 and 23, Onaka et al. teach an optical amplifier and the method inherent in the apparatus, further comprising detection means detecting each wavelength and power of signal light component and control means that adjusts the gradient $dL/d\lambda$, but fails to teach but fails to teach detecting at wavelengths greater than and shorter than the signal spectrum and determining the ASE spectral tilt based on said ASE detection. Kinoshita teaches

an ASE detection means where the detector detects a wavelength longer than

the longest signal wavelength and a wavelength shorter than the shortest signal

wavelength, see figures 10, 11B, 14, and 15, and column 11, lines 1-18, column

12, line 1 through column 13, line 6. Kinoshita also teaches determining tilt in the

ASE spectrum; see column 11, lines 14-18. It would have been obvious to

modify the apparatus of Onaka et al. by implementing the specific ASE monitor of

Kinoshita for the generic ASE monitor of Onaka et al. because that would allow

for ASE spectral monitoring which in turn protects against channels being buried

by noise.

With respect to claims 11 and 24, Onaka et al. teach an amplifier and the

method inherent in the apparatus comprising read means (detector array) that

read information (power level) related to the shortest and longest wavelength of

the signal light components and detecting ASE by determining a ratio between

maximum and minimum levels near a signal channel. It would have been

obvious to modify the apparatus of by detecting the signal power at the maximum

power level in the channel range in order to detect the signal at the point of

greatest SNR (signal to noise ratio).

3. Claims 12 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Onaka et al. in view of Clapp et al.

Clapp et al. describes the balance point (λc), in the predetermined

wavelength band, used to control the tilt of an optical attenuator. It would have

been obvious to modify the filter as taught by Onaka et al. to be controlled by setting a balance point in the predetermined band thus providing a simple gradient control scheme.

4. Claims 13 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. in view of Inoue et al. article published August 1991.

Onaka teaches a dynamic optical filter, but fails to teach a specific filter design. Inoue et al. teach a optical filter that comprises:

a main optical path divided into 6 regions;

a first sub-optical path coupled to the main path in a first and third regions;

a second sub-optical path coupled to the main path in a fourth and sixth region;

a first temperature adjusting device arranged in at least one of the second region of the main optical path and the corresponding region of the first sub-optical path; and

a second temperature adjusting device arranged in at least one of the fifth region of the main optical path and the corresponding region of the second sub-optical path. See figure 3.

It would have been obvious to modify the apparatus of Onaka et al. by substituting the tunable gain equalization filter of Inoue et al. for the generic gain equalization filter of Onaka et al. in order to reduce the accumulated tilt in a series of optical amplifiers.

5. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka
et al.

    With respect to claim 26, Onaka et al teach an amplifier comprising a
dynamic gain-flattening filter. It would have been obvious to calculate flat loss
spectrum that is substantially constant and independent of wavelength in order to
maintain the signal spectrum in an unaltered condition for instance when the
signal spectrum is flat exiting the amplifier or when the SNR is low and any
additional loss with result in the channel being buried in the ASE noise.

6. Claims 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable
over Onaka et al. in view of Becker et al.

    Onaka et al. teach an optical amplifier and the method inherent in the
apparatus comprising:

    one or a plurality of optical amplification sections each which has an
optical waveguide doped with a fluorescent material;

    an optical pumping light source;

    an optical filter capable of changing a gradient $dL/d\lambda$ of loss L dB with
respect to a wavelength λ nm. In a predetermined wavelength band; and

    control means for controlling the optical pump source and for adjusting the
gradient $dL/d\lambda$ of said optical filter.

See figures 8 and 13 and column 8, lines 32-64, and column 12, lines 1-15. It is inherent that the filter must adjust a gradient $dL/d\lambda$ in order to flatten an optical amplifier spectrum having a slope that may vary with pumping power and/or environmental conditions.

Becker et al. teach flattening an optical gain spectrum using a passive gain equalizing filter, see page 291-293. It would have been obvious to modify the apparatus of Onaka et al. by including a passive gain flattening filter in order to further flatten the gain spectrum.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Terahara '176

Terahara '535

Takeda et al.

Ball et al.

Day et al.

Wysocki et al.

Kim et al.

Lee et al.

Kinoshita et al. July 1999.
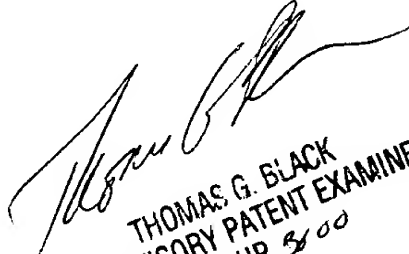
Response to Arguments

Applicant's arguments where found to be persuasive. The search has been updated and new rejections made.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen C. Cunningham whose telephone number is 703-605-4275. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G Black can be reached on 703-305-8233. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9326 for regular communications and 703-872-9327 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

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October 21, 2002

THOMAS G. BLACK
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GROUP 3600